

RARE SPECIES SURVEYS OF THE MANITOBA CONSERVATION DATA CENTRE, 2002



Manitoba Conservation Data Centre MS Report 03-02
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Executive Summary

Sound stewardship of species at risk is dependent upon having current information available to guide decisions related to species status, protection and recovery. This project provides current information for 14 rare species in Manitoba.

Extensive surveys for target species were conducted between May 27 and September 4, 2002. Potential habitat for each species was identified. Landowners with potential habitat were contacted before surveys to request permission to access private property. Activities included monitoring known rare species occurrences and surveying for new records. Survey results for each species, as well as recommendations regarding status, future inventory needs, and stewardship opportunities are presented. Other rare species that were encountered incidentally are also reported. All information collected was incorporated into a rare species database maintained by the Manitoba Conservation Data Centre (CDC).

Surveys were conducted for 14 provincially rare species in 2002:

Latin Name	Common Name	Updated Occurrences	New Occurrences
<i>Amorpha fruticosa</i>	False indigo-bush	2	3
<i>Bidens amplissima</i>	Vancouver Island beggar-ticks	0	0
<i>Buchloë dactyloides</i>	Buffalograss	1	0
<i>Celtis occidentalis</i>	Hackberry	0	0
<i>Chenopodium subglabrum</i>	Smooth goosefoot	0	0
<i>Cypripedium candidum</i>	Small white lady's-slipper	3	0
<i>Dicentra cucullaria</i>	Dutchman's breeches	1	0
<i>Krigia biflora</i>	Two-flowered cynthia	6	0
<i>Lomatium orientale</i>	White-flowered desert-parsley	0	0
<i>Mimulus glabratus</i>	Roundleaf monkey-flower	1	3
<i>Ophioglossum pusillum</i>	Northern adder's-tongue	1	0
<i>Sanguinaria canadensis</i>	Bloodroot	2	0
<i>Solidago riddellii</i>	Riddell's goldenrod	1	17
<i>Veronicastrum virginicum</i>	Culver's root	4	0

Information on habitat, precise geographic location, abundance and threats to populations was collected at all survey sites. This information will be entered into the Manitoba Conservation Data Centre Biological and Conservation Data (BCD) system. Habitat loss and fragmentation threaten all species surveyed in 2002.

Many populations of species at risk occur on private land; therefore, the actions of these landowners have critical bearing on the maintenance of Manitoba's biodiversity. Developing and implementing management plans in co-operation with landowners will have the greatest benefit for rare and at-risk species.

Acknowledgements

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Introduction

The objective of this survey was to collect up-to-date information on rare and uncommon vascular plants in Manitoba to determine their status and aid in making management decisions. Land managers benefit from information that helps them determine what activity or land use is appropriate for an area that contains rare species. Surveyors collected information on population size, number of occurrences, geographic distribution, trend in distribution, threats to populations, and threats to habitat. Future studies into the biology or ecology of rare species could build on the information gathered in the course of this survey.

In Manitoba, 24% of species tracked by the Conservation Data Centre (CDC) are provincially rare or uncommon (ranked between S1 and S3, see Appendix 1 for definitions of ranks). Of these rare species, 2% are rare globally rare or uncommon (ranked G1 to G3). Many Great Plains species reach the northern limit of their distribution in Manitoba, and these populations may represent remnants of formerly widespread species. Peripheral populations may have unique adaptations that allow them to survive at the edges of their ranges; these adaptations represent important aspects of the genetic diversity of a species (White and Johnson 1980). Many rare species in Manitoba occur in the mixed-grass and tall-grass prairie associations; both have been negatively affected by human activities, including intensive agriculture and urbanisation. It is therefore important for the survival of rare species to conserve the few remaining fragments of habitat.

This field report builds on the body of work previously conducted on rare plants in the province. In particular, knowledge gained through the extensive field research conducted by Elizabeth Punter has guided much of the work presented in this report. Despite the work already done, there are many gaps in the information available on rare plants, especially concerning the biology and ecology of many species. Rare species distributions in Manitoba remain poorly understood. Boivin conducted the last concerted floristic survey of Manitoba in the late 1950s (White and Johnson 1980), and information for many species has not been updated since then.

Methods

Species targeted for surveys in 2002 were selected and prioritised by global, national, and provincial ranks, as given by NatureServe (2001). Species listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), or the Manitoba Endangered Species Act (MESA) were given a higher priority. Species that have not been documented recently were considered higher priorities than species that had already been surveyed extensively in recent years.

Information was collected on preferred habitat for each species by checking herbarium records and information in the CDC database. Potential habitat for each species was identified using aerial photos, topographic maps, Landsat TM imagery, and soil maps. Where potential habitat existed on private land, landowners were contacted by mail or telephone to request permission to access their property. Surveys were restricted to southern Manitoba. Surveys were focused on plant species; however, information on priority animal species was collected on an opportunistic basis.

Areas with potential habitat for rare species were surveyed on foot. Surveys were conducted between May 14 and September 4. When rare plant populations were large enough to allow it, a voucher specimen was collected and deposited in the University of Manitoba Herbarium (WIN). The following information was collected for each rare species occurrence:

Estimates of population size and areal extent

Habitat information (associated species, slope, aspect, landform, soil properties, and land use)

Possible threats

Geographic co-ordinates (marked with a Garmin handheld GPS unit)

Digital or slide images

All the information collected was entered in the Manitoba CDC database, and new occurrences were mapped in the Biotics 3.1 GIS application. Results of surveys conducted on privately owned land were sent to each landowner.

Results

Thirteen rare plant species were targeted for surveys in 2002. Results for each species are presented below.

False Indigo-bush (*Amorpha fruticosa*)

G5, N1N2, S1S2

Data Collected in 2002

False indigo-bush (family Fabaceae) is a native, deciduous shrub growing between two to five metres high. The leaves are 15 to 40 inches long, with eleven to twenty-five oval leaflets (Looman and Best 1987). Pubescence is highly variable (Gleason and Cronquist 1991). The purplish blue scented flowers appear in June and occur in racemes up to 20 cm long (Looman and Best 1987). The fruits are pods up to 9 mm long (Gleason and Cronquist 1991), with conspicuous brown glandular spots (Boivin 1967).



False indigo-bush is commonly found on moist woods and streambanks (Gleason and Cronquist 1991). This species occurs in every state in the continental US except Nevada, Montana, and Alaska. Within Canada, the species is found in Manitoba, Ontario, Quebec, and New Brunswick (NatureServe 2001). Populations in eastern Canada are escaped ornamentals (Scoggan 1978).

False indigo-bush was surveyed on June 27, 2002. It was observed in a band 9 km long from East Selkirk to Larter's Golf Course along the western side of the Red River. Most of this area is heavily affected by human activities, especially residential development. The presence of false indigo-bush in disturbed areas indicates that it is at least somewhat tolerant of disturbance. The banks of the river are stabilised in some areas by large chunks of concrete and limestone. River Road runs alongside the river for much of this area, and false indigo-bush occurs mainly between the road and the river. These populations could be negatively affected by road maintenance activities. An unidentified insect was observed feeding on the leaves, in many cases nearly defoliating the entire shrub.

Incidentally Encountered Rare Species

None.

Status

False indigo-bush is ranked N1N2 in Canada, and is ranked S1 in Ontario. Argus and Pryer (1990) consider this species nationally rare. Globally, this species is secure (NatureServe 2001). This species has been reported from Quebec, but its status has not been determined. It has been introduced outside its native range as a nursery stock product. False indigo-bush is considered exotic along the East Coast, including New Brunswick. In Washington, false indigo-bush invades stream corridors and is considered a weed (Washington State Noxious Weed Control Board 2003).

Recommendations

Future Research

Research is required to identify the insect that was observed feeding on the leaves in 2002, and determine whether insect herbivory has a negative impact on the plant's health and viability. Searches further south along the Red River could reveal new occurrences.

Management

Inform highways crews or municipal maintenance staffs of false indigo-bush road rights-of-way of these plant occurrences, and determine whether a management strategy can be developed to allow false indigo-bush to survive at this location.

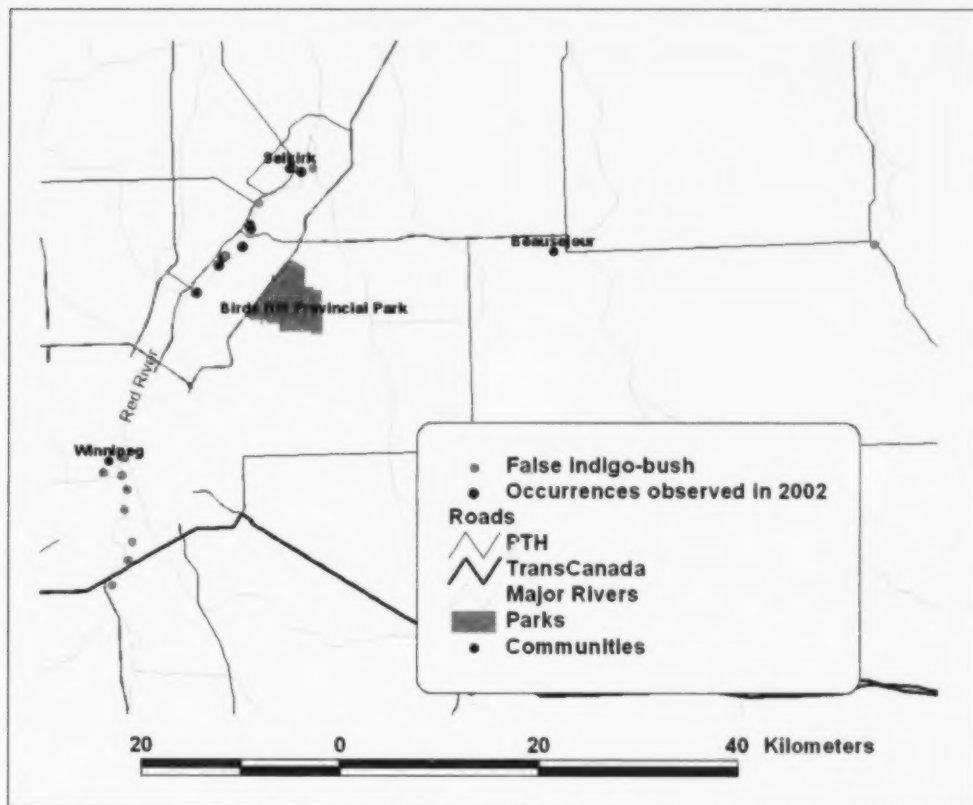


Figure 1. The distribution of false indigo-bush (*Amorpha fruticosa*) in Manitoba.

Vancouver Island Beggar-ticks (*Bidens amplissima*)

G3, N3, S1, COSEWIC Special Concern (In British Columbia)

Vancouver Island beggar-ticks (family Asteraceae) is an annual wetland plant that grows to a height of 50-100 cm and is characterised by large flowering heads containing yellow ray petals (Klinkenberg and Klinkenberg 2001). Fruits are achenes with flat or concave summits and two to four awns (usually three). Leaves can be simple or three-lobed. The species shares a number of features with nodding beggar-ticks (*B. cernua*), a common Manitoba beggar-tick, and is thought to have evolved only recently (Ganders et al. 2000).



Other than one historical record from Brandon, Manitoba, the entire global distribution of this species is limited to the Pacific Northwest coast. The species normally occupies the narrow band surrounding a stream, pond or lake that is subject to seasonal and annual water level fluctuations. The sole Manitoba record, collected in 1952, is from a wooded ravine containing a small intermittent stream.

Data Collected in 2002

The ravine at the Brandon Agricultural Research Station was surveyed twice in 2002 in an effort to locate Vancouver Island beggar-ticks. On July 17, *Bidens* plants were observed, but had not yet flowered. Two species of *Bidens*, Devil's beggar-ticks (*B. frondosa*), and tall bur-marigold (*B. vulgata*), were observed on August 14. Voucher specimens of both were collected. No other species of *Bidens* were observed. The ravine is characterised by a dense overstory of Manitoba maple (*Acer negundo*) along with small, untreed wetlands connected by an intermittent stream. These wetlands are dominated by reed canary grass (*Phalaris arundinacea*), marsh marigold (*Caltha palustris*) and spotted Joe-Pye weed (*Eupatorium maculatum*).

Incidentally Encountered Rare Species

None.

Status

The identity of the 1952 Brandon specimen was recently confirmed (pers. comm. Dr. Brian Klinkenberg, University of British Columbia). The likelihood that this species continues to occur in Manitoba, however, is low. The Brandon ravine is approximately 1600 km from the nearest known population near the Pacific coast. If Vancouver Island beggar-ticks is present at Brandon, it may have been introduced accidentally (Klinkenberg and Klinkenberg 2001).

Recommendations

Future Research

Given its national at-risk status, opportunistic surveys for Vancouver Island beggar-ticks should continue. Seeds of the species are known to remain dormant in the seedbank until appropriate climatic conditions arise (Klinkenberg and Klinkenberg 2001); therefore, attempts should be made to survey the Brandon ravine

in both wet and dry years. In addition, surveys should be conducted in mid-October, near the date of the original 1952 collection. This species closely resembles nodding beggar-ticks (*B. cernua*); therefore, if the identification is uncertain, then specimens should be submitted to a taxonomic expert for determination. The date and location noted in the original 1952 collection should be checked for accuracy, if possible.



Deep shade and moist soil characterises much of the Brandon ravine.

Management

Until specimens are observed in Manitoba, this species should be considered historic or accidental and stewardship activities should be focused elsewhere. It would be prudent, however, to protect the ravine at the Brandon Agricultural Research Station from development.

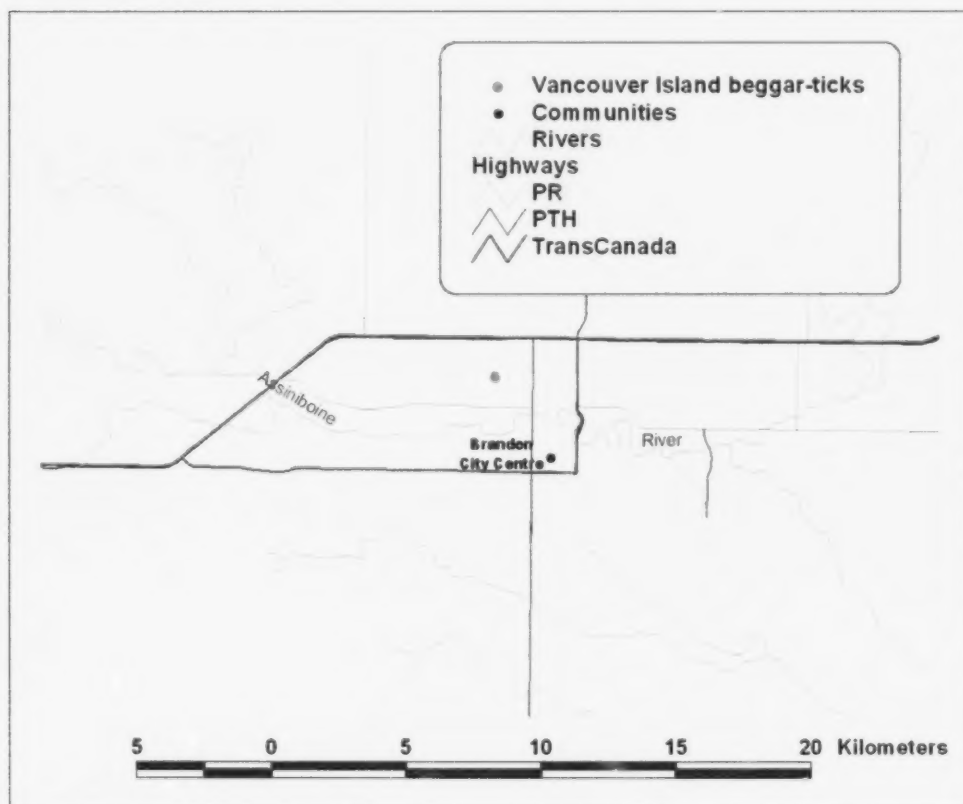


Figure 2. The distribution of Vancouver Island beggar-ticks (*Bidens amplissima*) in Manitoba.

Buffalo Grass (*Buchloë dactyloides*)

G4G5, N1, S1 COSEWIC Threatened

Buffalo grass (family Poaceae), the only species in the genus *Buchloë*, is a dioecious sod-forming grass, spreading by stolons to form clones up to 2 m across (Harms 1997). Pistillate spikes are 2-5 cm high and mostly concealed by the foliage. The female spikelets are enclosed by a bur-like structure that disperses intact. Staminate spikes, at the tops of slender culms mostly less than 12 cm high, surpass the foliage. The male plants resemble stunted specimens of blue grama grass, with curled leaf blades and short one-sided spikes.



In Canada, buffalo grass grows in clay to clay-loam soils, mostly below shale outcrops (Harms 1997). It occurs within the Souris River Valley in Manitoba, and is associated with gleyed black solonchic soils (Reimer and Hamel 2002). It is restricted to areas of unbroken native pasture. Grazing and moderate trampling may be required to reduce competition from other grasses (Harms 1997).

Data Collected in 2002

Unbroken native grasslands within the Souris River Valley south of Melita were searched for buffalo grass between July 17 and 19. Thirteen quarter sections were surveyed; buffalo grass was observed on 12 of these, including 10 parcels from which it was not previously reported. Buffalo grass was also found on one road allowance. Associated species and major sources of disturbance were noted at each site, and the extent of buffalo grass occurrences was recorded on aerial photographs. Work in the Souris River Valley was coordinated with research conducted through the Mixed-grass Prairie Inventory. Marilena Kowalchuk, the project biologist, found buffalo grass at 16 additional quarter sections from which it was not previously known. Including observations from previous surveys, buffalo grass is now known to occur on portions of 43 quarter sections within a 25 km long band within the Souris River Valley and Blind River Valleys of Manitoba. Unsuitable habitat in the form of cultivated fields, improved pastures, roads and railways separated occurrences.

The extent of buffalo grass on surveyed parcels varied from small patches less than 10 m in diameter to expansive bands running the length of a quarter section. Areas supporting extensive buffalo grass populations were characterised by small knolls and ridges (generally 2-5 m above the surrounding valley floor) oriented north-south within the valley (buffalo grass tended to occur on these rises and on the lower slope of the valley wall). All areas had native vegetation on unbroken pasture, and moderate to heavy grazing by livestock.

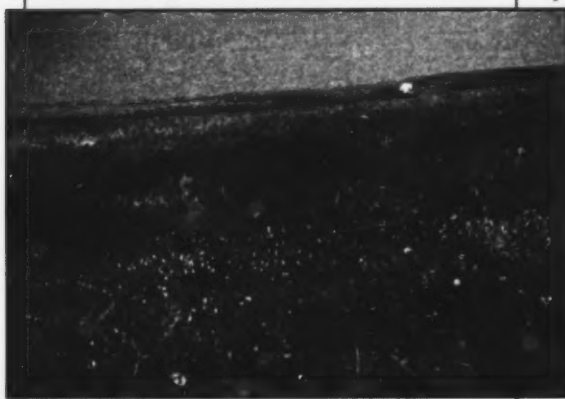
Incidentally Encountered Rare Species

Sprague's Pipit	<i>Anthus spragueii</i>	G4, N4B, S2S3B/SZN; COSEWIC Threatened
Whorled Milkweed	<i>Asclepias verticillata</i>	G5, N?, S2
Woolly Plantain*	<i>Plantago patagonica</i>	G5, N?, SU

*Represents only the second collection of this species from Manitoba.

Status

Buffalo grass has no legal protection in Manitoba. In November 2001, COSEWIC updated the status of buffalo grass to



Buffalo grass habitat in the Souris River Valley.

Threatened based on the use of quantitative criteria. The distribution of buffalo grass in Canada is extremely limited, occurring only within the Souris River Valley and Blind River Valley. Large-scale alterations in water drainage or flow resulting in the prolonged inundation of either valley could negatively affect buffalo grass populations. Buffalo grass is found discontinuously on portions of 43 quarter sections of land in Manitoba. All known occurrences are on privately owned land and adjacent road allowances.

Changes from current land use could threaten buffalo grass in Manitoba.

Recommendations

Future Research

Buffalo grass may exist on quarter sections not surveyed in 2002, especially on the western side of the Souris River Valley and in the Blind River Valley. Much of the work conducted on buffalo grass in Manitoba has focused on determining the extent of populations within the Souris River and Blind River Valleys. Detailed maps outlining the aerial extent and density phases of buffalo grass within 12 quarter sections were completed in 2002 by this project. Expanding this work to include other parcels where the species is known to occur will allow an accurate estimate of area of occupancy to be made.

Management

Interested landowners should be encouraged to preserve habitat for buffalo grass and other rare species through public awareness, conservation agreements, and programs that promote sustainable grazing.

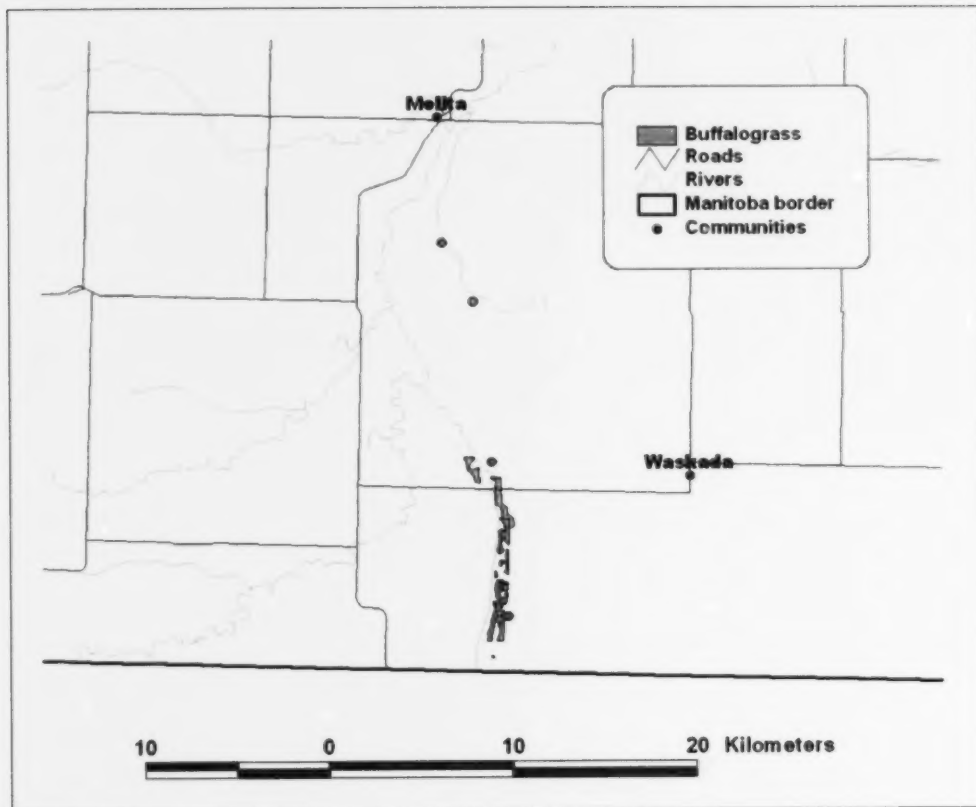


Figure 3. The distribution of buffalo grass (*Buchloë dactyloides*) in Manitoba.

Hackberry (*Celtis occidentalis*)

G5, N?, S1

Hackberry (family Ulmaceae) is a small deciduous tree with ascending or spreading branches that form a large crown (Farrar 1995). The bark of mature individuals is greyish-brown and deeply furrowed. Branches are alternate, as are leaves. Leaves are simple, oval to lance-shaped, 5-15 cm long, 3/5 as wide, tapered to the tip, sharp toothed to the middle, and lop-sided at the base. The minute, green flowers appear with, or before, the leaves. Orange-red berries turn dark purple at maturity.



Hackberry has a localised distribution in Manitoba (Reimer and Hamel 2002). The largest populations are found on beach ridges at the south end of Lake Manitoba, at Delta Marsh. Additional populations occur in dry prairie habitats of the sand hills of southwestern Manitoba. Sand Hill populations are typically found growing on the northeastern slopes of sand ridges, and are often limited to fewer than 20 mature individuals.

Data Collected in 2002

Surveying efforts focused on searching for populations in two areas where hackberry has not been previously recorded but which contain potentially suitable habitat: a sand hill complex near St. Lazare, and portions of the beach ridge forest on the southern shore of Lake Winnipeg. A small sand hill complex occurs near the confluence of the Qu'Appelle and Assiniboine Rivers just west of St. Lazare. The northern and eastern sides of larger hills are forested with a mix of green ash (*Fraxinus pennsylvanica*), Manitoba maple (*Acer negundo*), and bur oak (*Quercus macrocarpa*) and superficially resemble forest stands in the Lauder Sand Hills that contain hackberry. Searches for hackberry were conducted on May 27, June 20 and 27, and August 12. Hackberry was not observed.

A 3-km portion of the beach ridge forest at the southern end of Lake Winnipeg was searched on June 27. Forest composition was characterised by a dense canopy of Manitoba maple, green ash, cottonwood (*Populus deltoides*), and American elm (*Ulmus americana*), and appeared similar to stands at the south end of Lake Manitoba that contain hackberry, as described by Nash (1995). A 360-m portion of the beach ridge had been cleared recently for cottage development. Hackberry was not observed in the remaining intact forest.

One previously known hackberry population at the Manitoba Habitat Heritage Corporation's (MHHC) property in the Lauder Sand Hills was surveyed on May 29. As in 2001, the individuals observed appeared to be in poor health (Reimer and Hamel 2002).

Incidentally Encountered Rare Species

Sand bluestem	<i>Andropogon hallii</i>	G4, N1, S1
Smooth blue beard-tongue	<i>Penstemon nitidus</i>	G5, N?, S2
Low townsendia	<i>Townsendia exscapa</i>	G5, N?, S2

Status

The Manitoba Endangered Species Advisory Committee recommended a provincially Threatened status for hackberry on February 14, 2003. The distribution of this species in



Recently cleared beach ridge forest at the south end of Lake Winnipeg.

Manitoba is restricted, populations are disjunct, and many sand hill populations appear to have low reproductive rates and are under considerable disease stress (Reimer and Hamel 2002). Small portions of Manitoba's hackberry population are protected at the beach ridge at the south end of Lake Winnipeg and at the MHHC property in the Lauder Sand Hills. Further protection of additional populations would help to ensure the continued presence of this species in Manitoba.

The beach ridge forest at the south end of Lake Winnipeg may be important to migrating birds as a rest stop prior to or after migration over the lake, as it is at the south end of Lake Manitoba (Nash 1995). The permanent protection of a portion of this ridge would ensure the continued contribution of the area to Manitoba's biodiversity, and protect any hackberry that may be present.

Surveys of the sand hill complex near St. Lazare resulted in the collection of information on three provincially rare species, including sand bluestem (*Andropogon hallii*) a nationally rare species. These species are likely to be limited, on a regional scale, to the small stabilising sand dunes found at the confluence of the Assiniboine and Qu'Appelle Rivers. The nearest sand hills in Manitoba are the Routledge Sand Hills, 82 km to the southeast. The St. Lazare sand hills are threatened by sand extraction and aspen encroachment.

Recommendations

Future Research

Beach ridge forest extends for approximately 30 km along the south end of Lake Winnipeg. Only a small portion was surveyed in 2002. While much of the beach ridge has been developed for cottages, a large portion is relatively inaccessible and undeveloped. Surveys in these areas may yield new hackberry occurrences. Surveys for

hackberry elsewhere in the province have been fairly exhaustive (Nash 1995, Reimer and Hamel 2002, Dr. Norm Kenkel pers. comm.); however, surveys of appropriate habitat in the Portage Sand Hills and unsurveyed private lands near St. Lazare may result in the discovery of new populations.

Management

Habitat protection of sand hill areas through conservation agreements or other stewardship programs may be essential to the continued existence of the rare species occurrences found there.

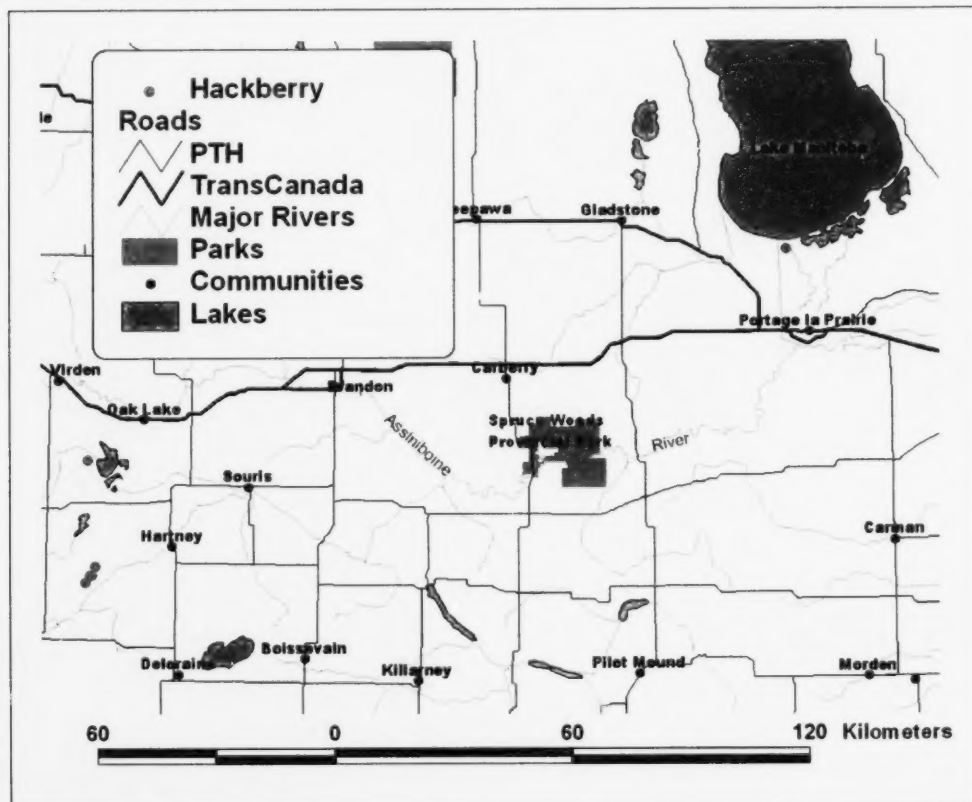
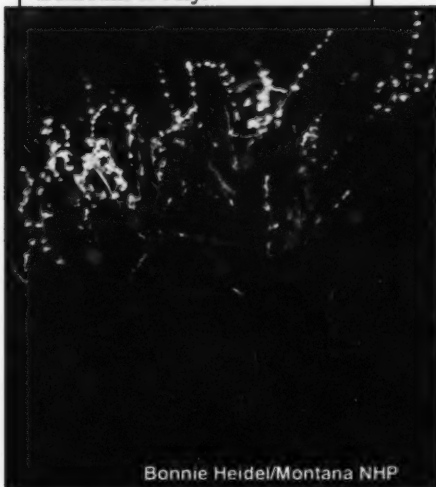


Figure 4. The distribution of hackberry (*Celtis occidentalis*) in Manitoba.

Smooth Goosefoot (*Chenopodium subglabrum*)

G3G4, N2, S1, COSEWIC Special Concern

Smooth Goosefoot (family Chenopodiaceae) is an erect or semi-erect annual that grows to a height of 20-80 cm (Looman and Best 1987). Leaves are glabrous, fleshy, entire, linear, and 1-veined and are arranged alternately on the numerous ascending branches. Stem leaves, however, are mealy. The entire plant is glabrous to only sparingly farinose. The inflorescence is open and leafy, and characterised by small greenish or reddish flowers produced in small widely spaced glomerules. Flowering occurs from June to July.



Bonnie Heidel/Montana NHP

This is a species of active sand dune systems. In Manitoba, the species has been recorded only once, in 1959, in the Routledge Sand Hills. Recent searches failed to locate the species and noted that previously open dunes in the Routledge Sand Hills have since been stabilised by woody species (Manitoba CDC 2001).

Data Collected in 2002

Searches for smooth goosefoot included eight quarter sections of open, destabilised sand dunes in areas of potential habitat in the Routledge Sand Hills. All open sand on these properties was surveyed between July 24 and 26. Voucher specimens of all species of *Chenopodium* encountered were collected and examined under high magnification to determine identity. No smooth goosefoot was observed.

While smooth goosefoot was not encountered, surveys of private land in the Routledge Sand Hills provided new information on five rare species, including two considered Threatened by COSEWIC.

Incidentally Encountered Rare Species

Sand Bluestem	<i>Andropogon hallii</i>	G4, N1, S1
Sprague's Pipit	<i>Anthus spragueii</i>	G4, N4B, S2S3B/SZN; COSEWIC Threatened
Schweinitz's Flatsedge	<i>Cyperus schweinitzii</i>	G5, N?, S2
Pincushion Cactus	<i>Escobaria vivipara</i>	G5, N?, S2
Western Spiderwort	<i>Tradescantia occidentalis</i>	G5, N1, S1; COSEWIC Threatened; MESA Threatened

Status

Smooth goosefoot is listed as a species of Special Concern by COSEWIC due to its rarity and the rapid decline of appropriate habitat in the Canadian prairies. It has not been documented in Manitoba since 1959. The species may be present but not have been detected due to a number of factors. Firstly, individual plants and flowers

are small, green and inconspicuous, secondly, surveys may not have coincided with the species' most conspicuous phenological

stages and, finally, *Chenopodium* seeds may persist in the soil for up to 40 years, remaining dormant until appropriate conditions allow for germination (Royer & Dickinson 1999).

Recommendations

Future Research

The original 1959 collection of smooth goosefoot in the Routledge Sand Hills was made on July 4. Surveys conducted in early July may have greater detection success than those reported here.

Additional information on the specific requirements for germination could help in planning future surveys, for example, whether germination is better in wet years compared to dry years. If germination requirements are not

met in the season of the survey, this annual species may not be present.



Potential Smooth Goosefoot habitat in the Routledge Sand Hills.

Management

Potential smooth goosefoot habitat in the Routledge Sand Hills occurs mostly on private land. Landowners should be encouraged to implement or continue management techniques that will help maintain open sand and grasslands. Landowners should be encouraged to work with organisations such as the Manitoba Habitat Heritage Corporation and the Mixed-grass Prairie Stewardship Program to implement these programs. Conservation agreements with landowners will help secure the continued presence of the remarkable diversity of rare and uncommon sand hill species.

Partially destabilised sand provides habitat for a number of rare species, including nationally rare sand bluestem (*Andropogon hallii*) and western spiderwort (*Tradescantia occidentalis*). The full diversity of native plants in sand hill areas can be promoted through management activities that help maintain a mosaic of open sand, grassland and wooded areas. Controlled burns and light grazing help limit the encroachment of aspen into grassland areas and, in combination with the control of leafy spurge populations can help maintain habitat for both rare and common native species, including smooth goosefoot.

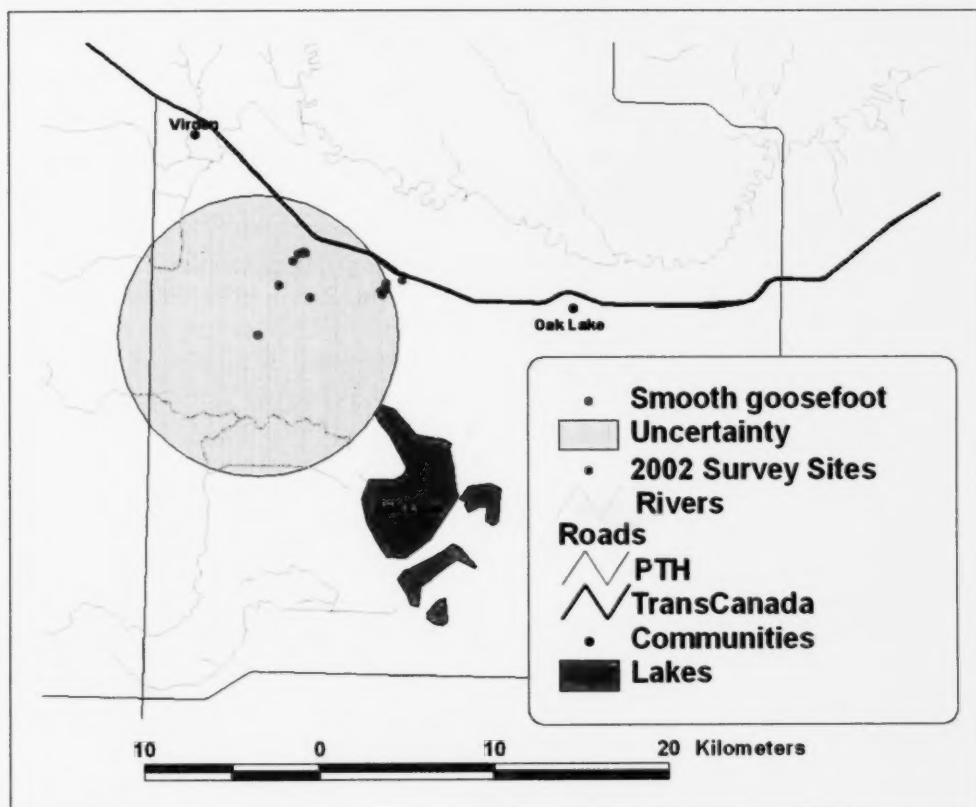


Figure 5. The distribution of smooth goosefoot (*Chenopodium subglabrum*) in Manitoba. The pale green circle represents an area of uncertainty related to the exact location of the 1959 collection. The site description of the original collection is vague; therefore, the occurrence was mapped with less precision than occurrences with detailed information on location.

Small White Lady's-slipper (*Cypripedium candidum*)

G4, N2, S1, COSEWIC Endangered, MESA Endangered

The small white lady's-slipper (family Orchidaceae) is a herbaceous perennial that can grow to a height of 10 to 35 cm. Plants grow in clumps, with each flowering stem surrounded by two to four leaves. One flower is found at the tip of a flowering stem, and consists of a white, pouch-shaped "slipper", streaked with a rose-purple colour, and two twisted, greenish-yellow side petals that can be spotted or streaked with purple (Manitoba Conservation 2000).



In Manitoba, the small white lady's-slipper can be found in calcareous (calcium-rich, or alkaline) prairie openings in wooded grasslands, or on more open, south-facing slopes. It most often grows in relatively undisturbed grassland, but can also be seen in disturbed sites such as roadside ditches (Manitoba Conservation 2000).

Data Collected in 2002

Small white lady's-slipper populations near Brandon were surveyed on June 13. A population in the Brandon Hills was estimated approximately 2,000 stems. An exact number could not be determined because some flowers were just starting to open. Before the flowers are fully open, it is difficult to distinguish between small white lady's-slippers and hybrids. A road allowance near Brandon held approximately 60 flowering stems of small white lady's-slippers, and two clumps of hybrids. A recently dug hole with one orchid growing beside it was observed at this site. One small white lady's-slipper flower was observed in a pasture near Brandon.

Hughes (2001) reported a small area of native grassland north of Emerson as a potential habitat for small white lady's-slippers. This site was surveyed on June 15, but only yellow lady's-slippers (*Cypripedium calceolus*) were observed at that time.

Staff at the Manitoba Tall Grass Prairie Preserve (TGPP) checked allevery known patches of small white lady's-slipper at the TGPP in 2002. All but one patch out of 24 was present at the time of survey; no new patches were recorded. In 2002, a completed census was not completed, but 925

flowering and vegetative stems were counted in four permanent plots, down slightly from 1,013 the previous year (C. Borkowsky pers. comm.).

Incidentally Encountered Rare Species

Yellow stargrass *Hypoxis hirsuta* G5, N?, S3

Status

The small white lady's-slipper is listed as Endangered under the Manitoba Endangered Species Act. The species has also been assigned a status of Endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and is listed as Endangered under Ontario's Endangered Species Act. The small white lady's-slipper is considered rare in virtually every state and province where it occurs, but overall it is considered apparently secure globally by NatureServe (2001).

Threats to the species include encroachment of woody species, late spring frosts, illegal collection of plants, spraying of herbicides and clearing of ditches, weedy species invasion, urbanisation, hybridisation with yellow lady's-slippers, and conversion of native prairie to agricultural land (Manitoba Conservation 2000).

The Manitoba TGPP protects over 2,100 hectares (5,200 acres) of habitat for native prairie species, including the small white lady's-slipper. The Brandon Naturalists Society has purchased a property near Brandon to protect the lady's-slippers found there.

Recommendations

Future Research

The Brandon Hills landowners are dedicated to maintaining the population of small white lady's-slipper on their property. Future research should focus on getting landowners involved with monitoring. There is a need to develop methods for surveying that would

allow landowners to conduct surveys for this species on



Habitat for small white lady's-slipper near the City of Brandon.

a voluntary basis. Information that landowners collected would be provided to the Manitoba Conservation Data Centre, and would be used to maintain current information on this species.

Management

Leafy spurge (*Euphorbia esula*) is a problematic invasive plant in the Brandon Hills site. The landowners control spurge with spot spraying.

Monitoring of small white lady's-slipper populations is done regularly in Manitoba

sites. Controlled burning, mowing and twice-over grazing can have positive effects on lady's-slippers, as

these practices appear to improve growing conditions by controlling woody species and clearing excess thatch (Manitoba Conservation 2000).

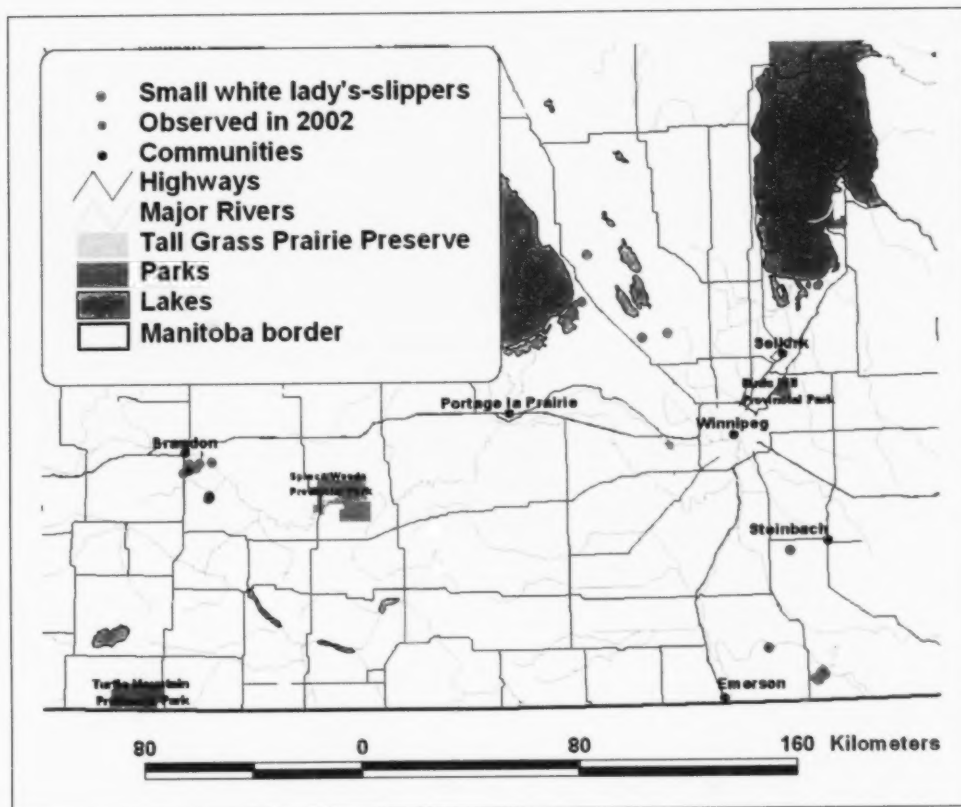


Figure 6. The distribution of small white lady's-slipper (*Cypripedium candidum*) in Manitoba.

Dutchman's breeches (*Dicentra cucullaria*)

G5, N?, S1

Dutchman's breeches (family Fumariaceae) is a perennial with finely dissected fern-like leaves. The plant gets its name from the flowers that resemble baggy white pants dangling upside down along the arched stem. The flowering stems are between 10 and 25 cm high. Both leaves and flowers arise from a short rootstock that bears white or pink bulblets (Flora of North America Editorial Committee 1997).



Dutchman's breeches is a spring ephemeral. In Manitoba, flowers appear in early to mid-May (Dr. Karen Johnson pers. comm.). Bumblebees and other long-tongued insects pollinate the flowers (Flora of North America Editorial Committee 1997), and soon after, spindle-shaped seedpods appear. After reproduction is finished, Dutchman's breeches goes dormant and disappears until the following spring.

Data Collected in 2002

There is a single naturally occurring population of Dutchman's breeches in Manitoba on Elm Point in Whitemouth Lake. The point is connected to the mainland by a floating bog. The soil is rich and high in organic matter. The treed area of Elm Point is approximately 0.2 km², although portions of the canopy had been removed recently, some removed by beaver, and others chopped down. In addition, elms (*Ulmus americana*) on this property have all succumbed to Dutch Elm Disease, creating extensive gaps in the canopy. Fifteen clumps of Dutchman's breeches were transplanted from Elm Point to the nearby Whitemouth Island between 1989 and 2001.

Elm Point and Whitemouth Island were surveyed on May 17. Several thousand stems of Dutchman's breeches cover approximately 0.016 km² of Elm Point. Fifteen transplanted clumps at Whitemouth Island produced 788 stems with ten inflorescences and 49 flowers.

Incidentally Encountered Rare Species

Blue cohosh	<i>Caulophyllum thalictroides</i>	G4G5, N4N5, S2
Sessile bellwort	<i>Uvularia sessilifolia</i>	G5, N?, S2

Status

Dr. Karen Johnson at the Manitoba Museum of Man and Nature collected data from this population from 1987 until 2001, when she retired. In 1989, individual plants were tagged along two transects, and annual monitoring was initiated. The land previously belonged to the Rural Municipality of Piney; however, the land was sold to private owners who have removed many of the tags.

The transplanted population is within the Whitemouth Island Ecological Reserve. Ecological Reserves are set aside for ecosystem and biodiversity preservation, research, education and nature study; they are not intended to be recreation, resource harvest or multiple-use areas.

Recent clearing for recreational use on Elm Point may have negative effects on the Dutchman's breeches population. Canopy openings may allow encroachment of weedier species like stinging nettle, which is abundant in another clearing on Elm Point.

Manitoba's population of Dutchman's breeches is disjunct from the rest of the species' range. If the population is extirpated, it is unlikely that the plant would become re-established without human intercession. An elaiosome is present on the seeds of



Recent clearing at Elm Point on Whitemouth Lake. Green vegetation in the middle ground

Dutchman's breeches (Flora of North America Committee 1997), an indication that ants play a major role in dispersal. The nearest native population of Dutchman's breeches is approximately 200 km away in Minnesota, likely too far for ants to travel.

Recommendations

Future Research

Future surveys are dependent on the level of interest of the current landowners. Research is required to determine what species of ants are on

Elm Point and Whitemouth Island to disperse the seeds.

Management

The Flora of North America Committee (1997) reports that Dutchman's breeches occurs in deciduous woods and clearings in rich loam soils. Management activities that promote deciduous woods and the formation of rich forest soils would likely benefit this species on Elm Point.

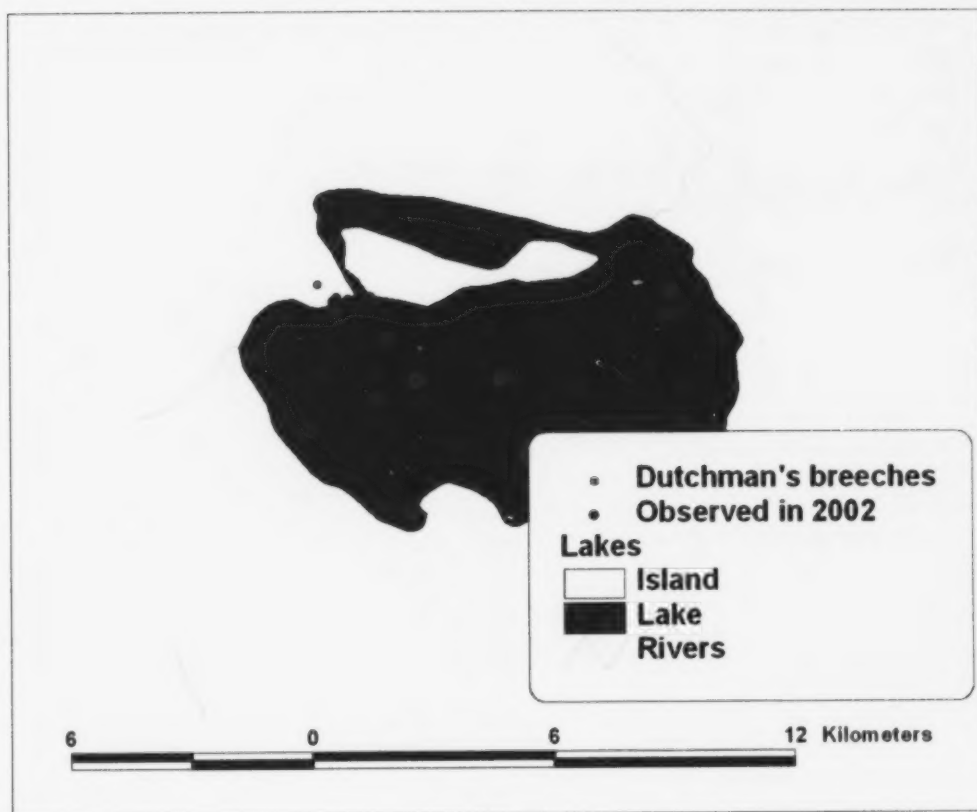


Figure 7. The distribution of Dutchman's breeches (*Dicentra cucullaria*) in Manitoba.

Two-flowered Cynthia (*Krigia biflora*)

G5, N2, S2

Data Collected in 2002

7wo-flowered cynthia (family Asteraceae) is a perennial with several orange dandelion-like flowers atop the stem. The plant exudes milky sap when the stem is broken, similar to sow thistles (*Sonchus* spp.). The involucre bracts are smooth, and all equal in length. A double pappus distinguishes *Krigia* species from similar composite flowers. Fruit is a small dark achene. The stem has few clasping leaves.



Two-flowered cynthia occurs in woods, roadsides and fields (Gleason and Conquist 1991). In Manitoba, populations occur in remnant tall-grass prairie near Woodlands and Stuartburn.

The area surveyed within the Rural Municipalities of Woodlands and Armstrong was comprised of a mosaic of aspen woodland, shrubland, grassland, and wetlands. Two-flowered cynthia occurred in grassland, on the moist open upland areas found between wetlands and woodlands. Common species associated with two-flowered cynthia included redtop (*Agrostis gigantea*), big bluestem (*Andropogon gerardii*), silverberry (*Eleagnus commutata*), and aspen (*Populus tremuloides*). Habitat for two-flowered cynthia may also support populations of Dakota Skipper; however, these butterflies require close examination for identification, which was not attempted as part of this survey.

Populations of two-flowered cynthia on the Tall Grass Prairie Preserve (TGPP) and RM of Stuartburn were not examined in 2002; however, staff at the Preserve regularly update information on all rare plants at the Preserve and these data are shared with the Manitoba Conservation Data Centre.

Fieldwork in 2001 identified potential habitat for two-flowered cynthia within the study area (Reimer and Hamel 2002). Many of these lands are held by private landowners. Landowners were contacted in 2002 and permission was granted to access 12 quarter sections; in addition, 24 quarter sections were surveyed from the road, totalling 36 parcels of land. Two-flowered cynthia was present on 30 of the surveyed parcels of land, and was not observed on six quarter sections.

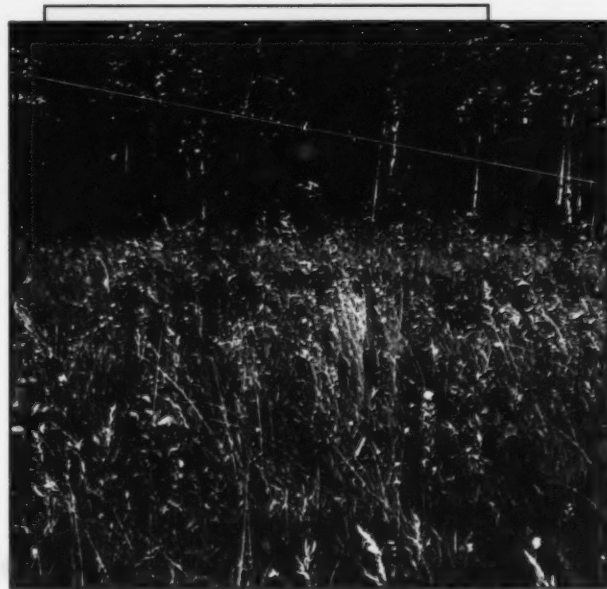
Three parcels of land were examined in greater depth between July 3 and July 5; on these parcels, a list of plant species list was compiled, and the population of two-flowered cynthia was estimated. No population estimates were made on parcels that were surveyed on or after July 8, due to the difficulty in identifying plants after flowering was complete. The quarter sections examined in detail had an average of 1,200 stems. Based on aerial extent of appropriate habitat, determined using aerial photographs, the total population of two-flowered cynthia in the Municipalities of Woodlands and Armstrong area likely exceeds 30,000.

Incidentally Encountered Rare Species

Monarch Butterfly	<i>Danaus plexippus</i>	G4, NZB, S5; COSEWIC Special Concern
Yellow star-grass	<i>Hypoxis hirsuta</i>	G5, N?, S3
Northern Leopard Frog	<i>Rana pipiens</i>	G5, N5, S4; COSEWIC Special Concern

Status

Two-flowered cynthia was listed as Vulnerable by the Endangered Species Advisory Committee on February 14, 2003. This designation offers no legal protection, but serves as a watch list. Several populations of two-flowered cynthia occur on the TGPP, where management practices include burning and grazing to reduce shrub encroachment and litter build-up. Populations on the TGPP are likely protected in the long term. Other



The habitat of two-flowered cynthia that is characterised by a mixture of trees, shrubs and grasses.

populations, especially in the Municipalities of Woodlands and Armstrong, have no legal protection. Two-flowered cynthia is present within the Inwood Wildlife Management Area, which is not a protected area.

Two-flowered cynthia resembles weeds like sow thistles (*Sonchus* spp.); therefore, it may inadvertently be targeted for herbicide application, especially in road rights-of-way.

Recommendations

Future Research

More research is required on the biology and ecology of two-flowered cynthia, especially to determine pollinators and limiting factors. No previous data are available to determine whether populations are stable, increasing, or decreasing. Recurring

surveys are required to determine population trends.

Management

Management practices, such as burning and light grazing should be encouraged on appropriate habitat in order to maintain areas of grassland and prevent further encroachment of shrubs and aspen. Conservation agreements with interested landowners could secure habitat for two-flowered cynthia. No leafy spurge was observed in the course of this survey, and with care, this situation can be maintained. Landowners should

be informed of the risks of introducing leafy spurge by transporting seeds via hay bales or farm machinery, especially mowers.

Herbicide application would be detrimental to roadside populations of two-flowered cynthia. Flowering is complete by mid-July most years, and spraying and mowing should not be carried out before then.

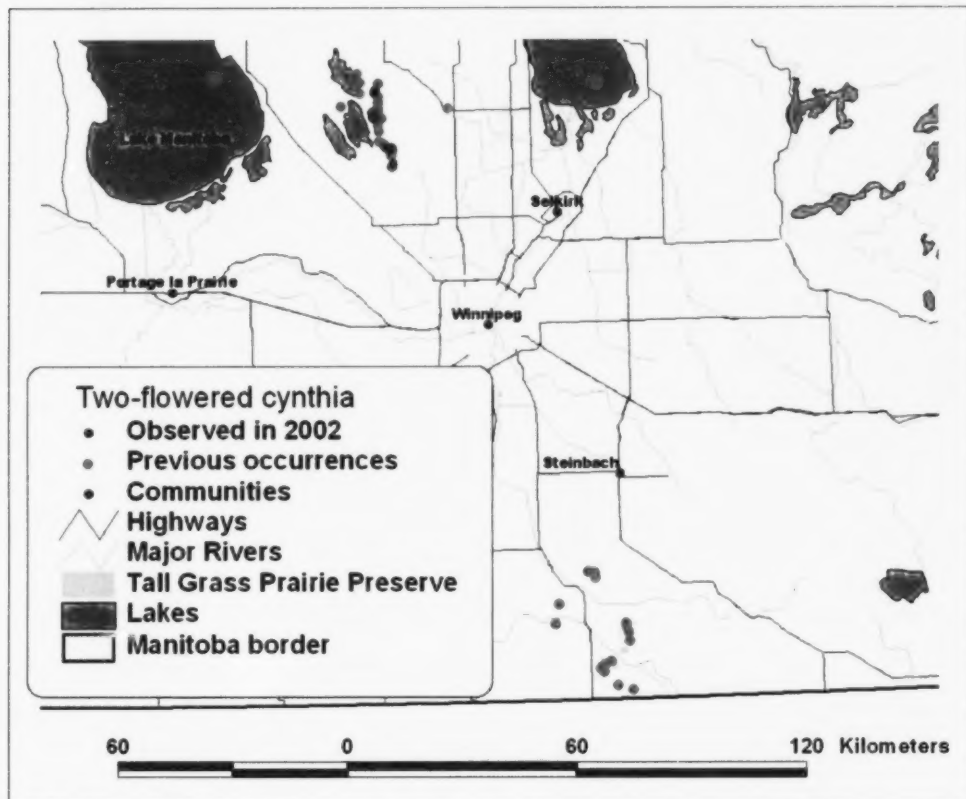


Figure 8. The distribution of two-flowered cynthia (*Krigia biflora*) in Manitoba.

White-flowered Desert-parsley (*Lomatium orientale*)

G5, N2, S1

White-flowered desert-parsley (family Apiaceae) is a perennial arising from a heavy taproot (Looman and Best 1987). The 3 to 4 times pinnately divided leaves arise basally. Umbels of white or pinkish flowers appears early in the growing season. This species can be distinguished from *Lomatium macrocarpum* by the presence of translucent-margined bractlets and winged seeds not longer than 6 mm.



In Canada, this species occurs only in southeastern Saskatchewan, and in southwestern Manitoba on dry hillsides and dry prairie in the Souris River Valley, and near Reston, Medora, and Thornhill. Five of the eight known occurrences of white-flowered desert-parsley in Manitoba were last observed over 40 years ago.

Data Collected in 2002

Attempts were made to update information on known populations in Thornhill (June 5), the Souris River Valley south of Coulter (July 17-19), and the Souris River Valley north of Minto (May 29). In addition, searches of prairie with coarse-textured soils were conducted in the Spy Hill-Ellice and Ellice-Archie Prairie Farm Rehabilitation Administration (PFRA) community pastures near St. Lazare (May 28 and June 18), and in the Routledge and Lauder Sand Hills (May 29). Potentially appropriate habitat was identified near Medora, but this area was not surveyed in 2002 because of time constraints.

White-flowered desert-parsley was not observed in 2002. Habitat that seemed to be suitable was observed at Thornhill, south of Coulter, and within the Ellice-Archie PFRA community pasture (unbroken mixed-grass prairie over sandy clay soil). Most of the floodplain of the Souris River Valley north of Minto has been cultivated; therefore, suitable habitat may no longer exist there. Prairie on the south-facing valley wall, where the species was last collected in 1950, was dominated by non-native smooth brome (*Bromus inermis*).

Two other species of *Lomatium* were observed in 2002: large-fruit desert-parsley (*L. macrocarpum*) and carrotleaf desert-parsley (*L. foeniculaceum*), as well as other species in the same family, namely Plains wavewing (*Cymopterus acaulis*) and wild parsley (*Musineon divaricatum*). These species are provincially rare or uncommon, except for carrotleaf desert-parsley whose conservation status is undetermined. Surveyors collected information that contributed to the knowledge of the conservation status and stewardship needs of these species.

Incidentally Encountered Rare Species

Shining arnica	<i>Arnica fulgens</i>	G5, N?, S2?
Plains wavewing	<i>Cymopterus acaulis</i>	G5, N?, S3
Large-fruit desert-parsley	<i>Lomatium macrocarpum</i>	G5, N?, S3
Wild parsley	<i>Musineon divaricatum</i>	G5, N?, S2
Indian rice grass	<i>Oryzopsis hymenoides</i>	G5, N?, S2
Early yellow locoweed	<i>Oxytropis sericea</i>	G5, N?, S1
Pincushion beardtongue	<i>Penstemon procerus</i>	G5, N?, S1S2
Golden-bean	<i>Thermopsis rhombifolia</i>	G5, N?, S2



Unbroken mixed-grass prairie near Thornhill. White-flowered desert-parsley, last observed at this location in 1986, was not observed in 2002.

Status

White-flowered desert-parsley is nationally rare in Canada and is on the working list of vascular plant candidates for COSEWIC report preparation (Erich Haber, Chair, COSEWIC Plants and Lichens Species Specialist Subcommittee pers. comm.). The ephemeral nature of this species and its confusing identification characteristics may have contributed to the paucity of reports from Manitoba. Intensive surveys have failed to locate previously known or new populations. Although the species may be easily overlooked, suitable habitat is scarce, as well. Given the uncertainty of the species status in Manitoba, protection of this habitat would be prudent. The Thornhill area, in particular, is of concern as unbroken prairie is now restricted to only a handful of quarter sections.

Threats at Thornhill and in the Souris River Valley south of Coulter include cultivation and the cessation of grazing and resultant encroachment of woody species. Leafy spurge (*Euphorbia esula*) was observed on surveyed lands near Thornhill. Unchecked, this species could result in a dramatic decline in the

native biodiversity on these parcels (Mixed-grass Prairie Stewardship Program, undated).

Recommendations

Future Research

Future field surveys are essential in order to make an adequate assessment of the status of this species in Manitoba. Previously collected specimens, as logged in the Manitoba CDC rare species database, have been collected from May 16 to June 26, at all stages of development. Identification is difficult without fully developed flowers or seeds, and some records note that identifications should be considered tentative until more fully developed individuals are observed at the same location. Locations from which the species was recently collected should be surveyed weekly from early May to early July to determine the phenology of this and closely related species in Manitoba, and to determine

when surveys would offer the best opportunity to distinguish among species. The information gained from this type of research could be used to refine and focus the temporal range of future surveys.

Management

White-flowered desert-parsley records from the Souris River Valley south of Coulter are located on lands that also contain nationally rare buffalo grass (see buffalo grass summary in this report). Protection of these lands would protect the habitat of both species. Potentially appropriate habitat within the Ellice-Archie PFRA community pasture is generally protected from cultivation and overgrazing by the conservation mandate of PFRA management.

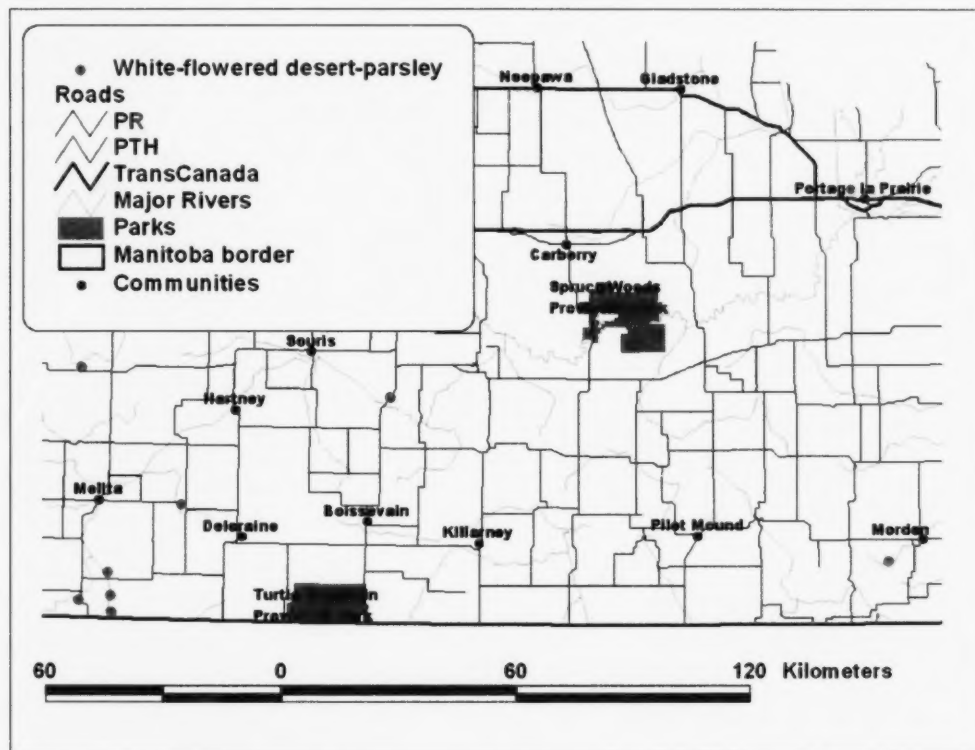


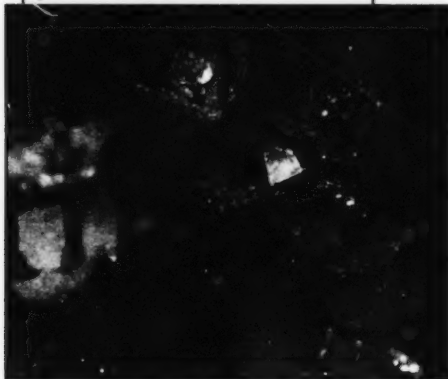
Figure 9. The distribution of white-flowered desert-parsley (*Lomatium orientale*) in Manitoba.

Roundleaf Monkey-flower (*Mimulus glabratus*)

G5, N2, S1

Roundleaf monkey-flower

(family Scrophulariaceae) is a small, low, branching and mat-forming perennial wetland plant (Larson 1993). Leaves are opposite, generally round and smooth, or sometimes with minute hairs. The small, irregular, bright yellow flowers occur in the axils of the leaves (Gleason and Cronquist 1991). Flowering occurs from July to August. Four varieties are recognised, but the only one that occurs in Manitoba is var. *jamesii* (Kartesz 1999).



The species is found in springs, seeps and the banks of spring-fed streams (Larson 1993), especially in alkaline conditions (Gleason and Cronquist 1991).

Data Collected in 2002

Three new occurrences of roundleaf monkey-flower were located in 2002, and one known occurrence was updated. Two new occurrences were located in the Spy Hill-Ellice Community Pasture in springs along the Qu'Appelle River. Roundleaf monkey-flower was abundant at both of these locations. The third new occurrence was located in an unnamed tributary of Scissor Creek in the Ellice-Archie Community Pasture. Scissor Creek flows through the Community Pasture, and then empties into the Assiniboine River south of St. Lazare. Surveys of the Community Pastures were conducted on August 13.

Populations of roundleaf monkey-flower in Spruce Woods Provincial Park occur in springs that percolate through pure mineral sand, creating a bowl formation (Reimer and Hamel 2002). In contrast, the springs within the Community Pastures are darker, finer textured soils. The site in Ellice-Archie is at the top of a seepage slope, and the flowing water from the spring has not created a channel or a bowl formation. A similar seep along the Isputinaw Trail in Spruce Woods Provincial Park was surveyed on August 14, but no roundleaf monkey-flower was observed.

Roundleaf monkey-flower was reported at Wigle Springs in a springy meadow at the foot of a sand slope in 1951. In 2001, it was found growing in a seep right at the edge of the Assiniboine River, next to a cabin near Wigle Springs. Another small patch was found in a small spring beside a nearby road. No roundleaf monkey-flower was observed in the main bowl formation at Wigle

Springs during the survey on July 24.

Despite habitat differences, all roundleaf monkey-flower populations in Manitoba occur in cold, flowing spring water in predominantly sandy soils.

Incidentally Encountered Rare Species

Northern Leopard Frog *Rana pipiens* G5, N5, S4; COSEWIC Special Concern

Status

Roundleaf monkey-flower was recommended for listing as a Threatened species in Manitoba by the Manitoba Endangered Species Advisory Committee on February 14, 2003. Populations at the Hogsback and Devil's Punch Bowl are protected under the Provincial Parks Act. Other known populations are currently unprotected. A species status summary report for the Manitoba Endangered Species Advisory Committee is currently in preparation.

Changes in groundwater levels could affect the springs in which roundleaf monkey-flower occurs. Farmers in the Carberry area irrigate crops like corn and potatoes extensively. Since CFB Shilo and Spruce Woods Provincial Park occupy large tracts of land, it is unlikely that groundwater levels in the area from which the species is known will be affected (Reimer and Hamel 2002). Irrigation is not common in the Qu'Appelle Valley and Upper Assiniboine region of Manitoba.



Cattle trails through a spring in the Spy Hill/Ellice Community Pasture.

Populations of roundleaf monkey-flower in the Community Pastures are trampled by cattle as they come to drink. The species may be tolerant of disturbance, since it continues to survive at these sites.

Roundleaf monkey-flower is rare in each of the Canadian jurisdictions where it occurs (NatureServe 2001). Globally it is considered secure, although a closely related subspecies Michigan monkey-flower (*Mimulus glabratus* var.

michiganensis) is federally Endangered in the United States (Penskar and Higman 2001).

Recommendations

Future Research

Research is required to determine the range of pH and water temperature tolerated by roundleaf monkey-flower, and the nutrients available in the spring water where it occurs. This knowledge will allow management efforts to focus on the maintenance of critical habitat.

Management

Research in Australia indicates that fencing springs to prevent animal grazing leads to springs being overgrown with vegetation, but if grazing is allowed then feces and siltation caused by trampling reduce water quality (Unmack 1995). The establishment of exclosures within the springs in the Community Pastures could help determine whether keeping cattle out of the headwaters of springs is beneficial to roundleaf monkey-flower populations.

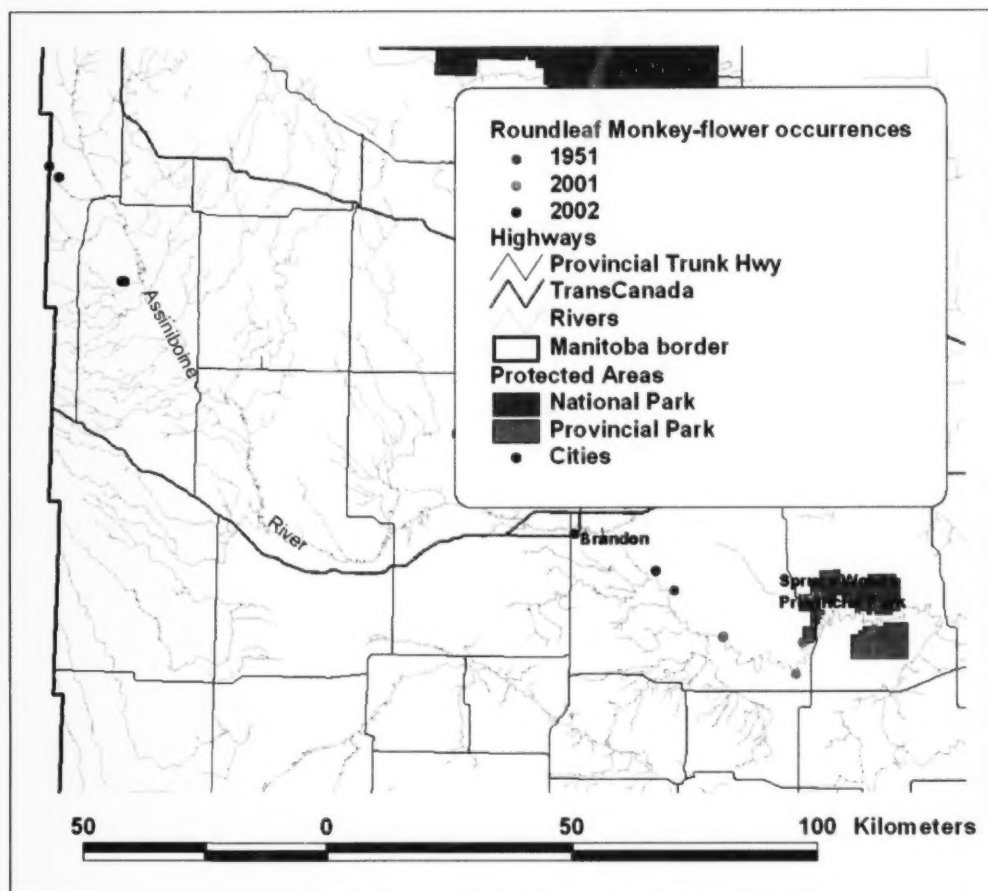


Figure 10. The distribution of roundleaf monkey-flower (*Mimulus glabratus*) in Manitoba.

Northern Adder's-tongue (*Ophioglossum pusillum*)

G5, N?, S1

Northern adder's-tongue (family Ophioglossaceae) is a perennial fern arising from tan to yellow-coloured rootstocks. Each stem has a single leaf that is divided into a fertile portion (sporophore) and a sterile portion (trophophore). The trophophore widens gradually to form a blade up to 3.5 cm wide and 10 cm high. The sporophore may be up to 4.5 times the height of the trophophore, bearing 10-40 pairs of sporangia at the tip (Flora of North America Editorial Committee 1993).

Data Collected in 2002

A single occurrence of northern adder's-tongue is known from Manitoba. Staff at the Manitoba Tall Grass Prairie Preserve (TGPP) first documented this occurrence in 1995 on two adjacent quarter sections bisected by a gravel road. This is considered a single occurrence that is bisected by a road. Many stems were observed on either side of the road when this site was surveyed on August 22.

Other apparently similar habitat exists, but does not appear to be occupied. Similar habitat in the Gardenton Community Pasture was surveyed on foot on September 4, but no northern adder's-tongue was observed.



Incidentally Encountered Rare Species

Northern Leopard Frog	<i>Rana pipiens</i>	G5, N5, S4; COSEWIC Special Concern
Riddell's goldenrod	<i>Solidago riddellii</i>	G5, N3, S2; COSEWIC Special Concern; MESA Threatened

Status

Northern adder's-tongue is not listed under the Endangered Species Act in Manitoba. A status summary is currently in preparation for review by the Manitoba Endangered Species Advisory Committee. The TGPP protects habitat for this

species in Manitoba.

This species is easily overlooked because of its resemblance to seedlings of many monocot species, and thus may be more common than collections indicate (Flora of North America Editorial Committee 1993).

The Ontario Natural Heritage Information Centre ranks

northern adder's-tongue S4S5, indicating that it is likely secure in that province (NatureServe 2001).

The single occurrence in Manitoba is in wet prairie. In other areas it grows in fens, marsh edges, pastures, grassy shores and roadside ditches (Flora of North America Editorial Committee 1993).

Recommendations

Future Research

Before additional surveys are undertaken, there is a need to understand the factors limiting northern adder's-tongue in Manitoba. This species is inconspicuous and difficult to locate in the field. Better knowledge of habitat

specificity could narrow search parameters and maximise efficiency, thus increasing the likelihood of success.

Management

Current management practices on the TGPP include burning and mowing to reduce shrub encroachment. Both quarter sections on which northern adder's-tongue occurs were burned in the spring of 2002 (L. Reeves pers. comm.).



Northern adder's-tongue in late summer at the TGPP.

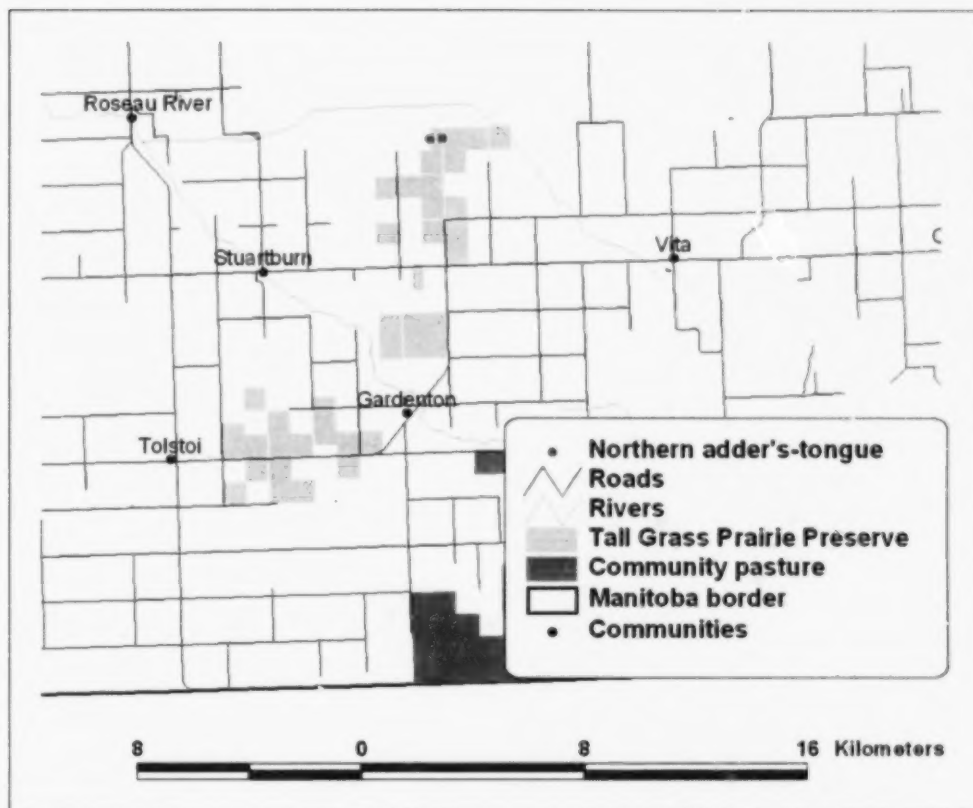


Figure 11. The distribution of northern adder's-tongue (*Ophioglossum pusillum*) in Manitoba.

Bloodroot (*Sanguinaria canadensis*)

G5, N?, S2

Bloodroot (family Papaveraceae) blooms in early to mid-May. Flowers have 6-12 white to pinkish petals (Flora of North America Editorial Committee 1997). The common name is derived from the bright red latex exuded by damaged tissue, especially the roots. The rhizomes are branched, many adventitious roots, stems arising from rhizome. A single leaf envelops the developing floral bud. The leaves are prominently veined and glaucous on the underside.



Bloodroot occurs in rich, mesic to somewhat dry deciduous forests and coves with fertile soils and circumneutral to basic soil pH (NatureServe 2001). This species occurs in aspen woodlands in the northwest portion of its range (Nature Serve 2001). Bloodroot occurs in moist to dry woods and thickets, often on flood plains and shores or near streams on slopes, less frequently in clearings and meadows, and rarely in disturbed sites (Flora of North America Editorial Committee 1997).

Data collected in 2002

Potential bloodroot habitat in the Rural Municipalities of Thompson and Lorne, including the Deerwood Wildlife Management Area (WMA), was surveyed on May 14, 2002. A known population of bloodroot was observed east of St. Lupicin, but no new occurrences were found in the WMA. At the site east of St. Lupicin, bloodroot was most abundant on a north-facing gentle slope near Tobacco Creek. Bloodroot was found under a canopy of maple (*Acer negundo*) and ash (*Fraxinus pennsylvanica*). Dead elm trees (*Ulmus americana*) were present.

A survey was conducted at the Manitoba Forestry Association site near Hadashville on May 24. Some of the plants at the Manitoba Forestry Association site had pedicels, indicating that the plants had blossomed, but the flowers had been broken off. Based on field work conducted in 2002, it is likely that one occurrence in the Manitoba CDC database was mapped incorrectly. Forested areas were surveyed along the Whitemouth River north of Hadashville. No new occurrences of bloodroot were found.

Bloodroot was reported from the Notre Dame de Lourdes area in the 1940's. Some potential habitat exists in that area in very narrow bands along small streams, some of which are accessible to cattle.

Incidentally Encountered Species

Canada wild- ginger	<i>Asarum canadense</i>	G5, N5, S3?
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Status

Bloodroot has no legal protection in Manitoba. Globally, this species is secure (NatureServe 2001). Within Canada, the Ontario Natural Heritage Information Centre ranks this species S5 (secure). Bloodroot may be declining globally due to habitat loss and collection for medicinal uses (NatureServe 2001). In Manitoba, appropriate habitat occurs in narrow strips along creeks

and streams that are usually surrounded by agricultural land. These stream banks are threatened by the invasion of non-native species, such as burdock (*Arctium* sp.), which is common at St. Lupicin. Some local residents in St.

Lupicin are concerned about large-scale hog operations scheduled for construction in the area.



Bloodroot habitat near St. Lupicin.

Recommendations

Future Research

More information is required to determine at what level this species is being collected in the extent of wild for traditional or commercial collecting purposes. A thorough search of possible habitat near Notre Dame de Lourdes is required to determine whether historical populations remain extant. Determining limiting factors, especially at the Manitoba Forestry Association site, may explain the reasons for the low reproduction observed in 2002.

Management

The Manitoba Forestry Association is aware of the bloodroot at the site south of Hadashville, and incorporates the presence of bloodroot into educational tours. Public awareness campaigns may prevent picking or unintentional destruction of habitat. Efforts should be made to control invasive species at St. Lupicin.

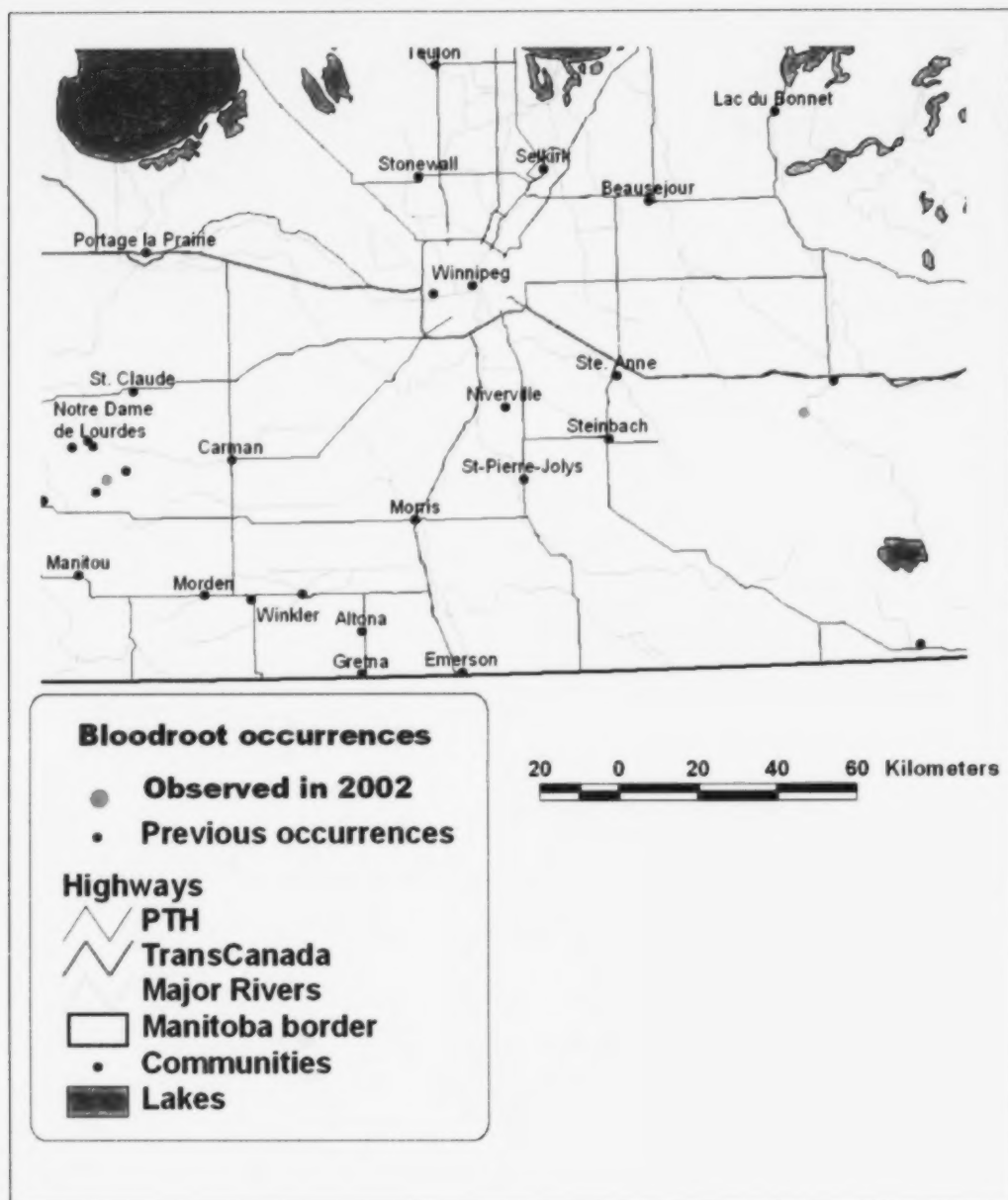


Figure 12. The distribution of bloodroot (*Sanguinaria canadensis*) in Manitoba.

Riddell's Goldenrod (*Solidago riddellii*)

G5, N3, S2, COSEWIC Special Concern, MESA Threatened

Riddell's goldenrod (family Asteraceae) is a perennial with erect stems 40 to 100 cm tall (Zhang et al. 2000). The linear, tapered leaves are recurved and usually three-veined. The yellow inflorescence is flat-topped to rounded. Flowering occurs from late August to early September. Riddell's goldenrod can hybridise with both stiff goldenrod (*Solidago rigida*) and white upland aster (*Solidago ptarmicoides*).



The species occurs on moist to wet calcareous sandy loam soils along relatively undisturbed roadsides, in tall grass prairie, and in open shrubby fens. In Manitoba, populations occur from Ross south to the Minnesota border, but the greatest concentrations are at Kleefeld/Hochstadt, Gardenton, and Green Ridge.

Data Collected in 2002

Surveys were conducted on August 22, August 29, and September 4, and focused on monitoring known records from the Gardenton/Green Ridge area. Twenty of 30 known occurrences of Riddell's goldenrod were surveyed in 2002. While 17 populations were confirmed as extant, three could not be located.

A previously unknown population was discovered at the north edge of the Gardenton Prairie Farm Rehabilitation Administration (PFRA) community pasture. Like most populations outside of the Tall Grass Prairie Preserve (TGPP), this occurrence is limited to a thin band of habitat held within a secondary road allowance. Surveys within the Gardenton PFRA Community Pasture revealed that three separate known occurrences of Riddell's goldenrod near its western edge are actually part of one continuous population comprised of thousands of individual stems that occupy the margins of forested ridges. An additional new population was discovered on a privately owned quarter section of land near Hochstadt. Identification of the Hochstadt population is tentative, however, as plants were not yet in flower when surveyed on July 30. Hundreds of stems were observed, ranging over 6.2 hectares of remnant tallgrass prairie. A new population of Riddell's goldenrod was also discovered in the north block of the TGPP.

Incidentally Encountered Rare

Species

Slender false-foxglove	<i>Agalinis tenuifolia</i>	G5, N?, S2S3
Four-flowered loosestrife	<i>Lysimachia quadriflora</i>	G5?, N?, S2
Great Plains ladies'-tresses	<i>Spiranthes magnicamporum</i>	G4, N3, S1?, MESA Endangered

Status

While Riddell's goldenrod is legally protected under Manitoba's Endangered Species Act, permanent habitat protection exists only for populations at the TGPP. Most other populations are on private land or in road or railway allowances where habitat is not protected. Populations in road allowances may be at risk from maintenance activities such as haying, spraying of herbicides, drainage improvement, and trenching or digging

activities conducted by municipalities or utility companies. Occasionally, adjacent landowners hay or cultivate road allowances as well. Three populations in road allowances, last observed in 1997 or 1998, could not be located in 2002 and may have been eliminated.



Grazed, remnant tallgrass prairie near Hochstadt. Riddell's goldenrod occurs at the prairie/woodland interface on this property.

Recommendations

Future Research

Regular monitoring of known populations and threats should continue. Searches of the south-central portion of the Gardenton PFRA community pasture may yield new occurrences. The tentative identification of the new

population at Hochstadt should be confirmed.

Management

Stewardship efforts should be focused on securing the habitat of additional populations of this species. The population near Hochstadt, in particular, is near the known northern range of extant populations in Canada and lies on one of the few unbroken parcels of tallgrass prairie remaining in the area. This parcel of land should be a priority for the establishment of a permanent conservation agreement with the landowner. The establishment of a rotational grazing program may also benefit Riddell's goldenrod on this property. Discussions with local road maintenance managers and Rural Municipality councils should be initiated in order to increase local awareness of the presence of Riddell's goldenrod in road allowances and available stewardship options. Stewardship options include delaying mowing and haying until after seed set, avoiding the use of herbicides, and careful road maintenance activities in the vicinity of known populations.

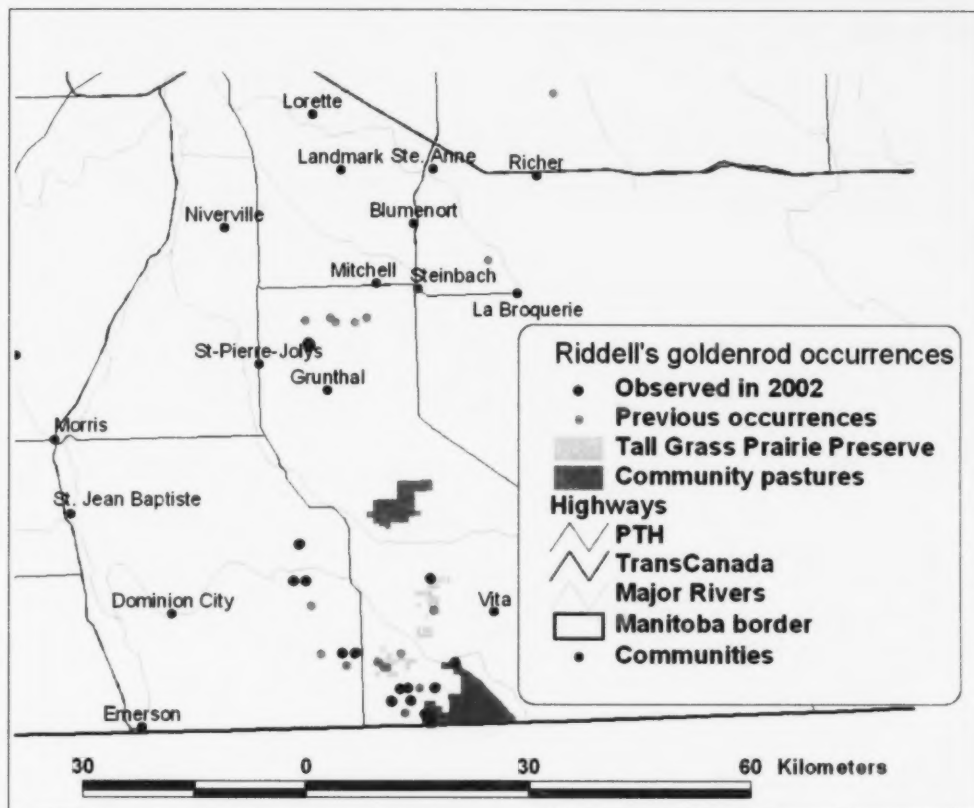


Figure 13. The distribution of Riddell's goldenrod (*Solidago riddellii*) in Manitoba.

Culver's Root (*Veronicastrum virginicum*)

G4, N2, S1; MESA Threatened

Culver's-Root, belonging to the Scrophulariaceae, is a tall perennial, occasionally up to 2 m in height. The leaves are arranged around the simple stems in whorls of three to nine. They are lance-shaped, long pointed at the apex, narrowed at the base, and sharply toothed (Eggers and Reed 1997). The tube-shaped flowers are white-to-pinkish, with two long protruding stamens, and are crowded on a slender, spike-like inflorescence from 8-20 cm long. Culver's root blooms from July to August. The fruits are ovoid many-seeded capsules (U.S. Department of Agriculture undated).



Culver's root occurs in a variety of habitats throughout its range. It is found in moist tallgrass prairie remnants, moist woods and edges of woodlands, fields and meadows. It also occurs in roadsides, road allowances, and railway rights-of-way (Nature Serve 2001).

Data collected in 2002

Records for several populations in ditches in the Rural Municipality of Franklin were updated on August 29. Culver's root and Riddell's goldenrod occupy similar habitat, but in the process of gathering information on Riddell's goldenrod occurrences, no new occurrences of Culver's root were discovered.

The Culver's root population at the Overstoneville Independent Cemetery showed continued decline in 2002. In 1997, the population consisted of 356 stems on a rail embankment outside the cemetery, and 46 stems in the cemetery. In 1998, the rail embankment was levelled, leaving only the plants within the cemetery. The cemetery has since been cleared of all shrubs, and black topsoil was laid down under the few remaining oak trees, so that in 2002, the plants in the cemetery could not be located. Approximately 20 stems of Culver's root, found growing approximately 190 m west of the cemetery in a ditch at the edge of a hayfield, are likely all that remains of this occurrence.

Another occurrence was located along the rail embankment in 1997, adjacent to NW-30-1-5E. The portion of the section where Culver's root was documented was dominated by alfalfa. No Culver's root was observed at this location, and this population was presumably destroyed in 1998 when the embankment was levelled.

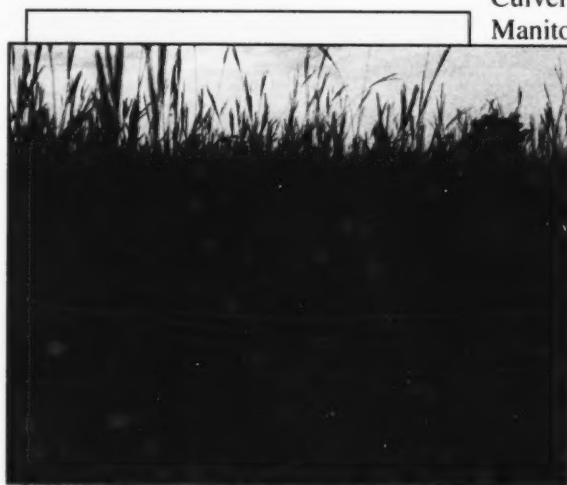
An occurrence in a roadside ditch adjacent to NW 34-1-5E had 17 stems in 1997 and 16 stems in 2002.

A population of Culver's root in the RM of Hanover that was last seen in 1997 was not found in 2002. There is no information to suggest what lead to this population's apparent disappearance.

Incidentally Encountered Rare Species

Slender-leaf false foxglove	<i>Agalinis tenuifolia</i>	G5, N?, S2S3
Cooper's vetch	<i>Astragalus neglectus</i>	G4, N3, S1
Northern Leopard Frog	<i>Rana pipiens</i>	G5, N5, S4; COSEWIC Special Concern
Riddell's goldenrod	<i>Solidago riddellii</i>	G5, N3, S2; COSEWIC Special Concern; MESA Threatened

Status



The Tall Grass Prairie Preserve near Vita, Manitoba provides habitat for Culver's root.

Culver's root was listed as Threatened by the Manitoba Endangered Species Act in 2001.

Under the Act, it is unlawful to harm this species or its habitat.

Culver's root is present at the Manitoba Tall Grass Prairie Preserve (TGPP). Management practices at the preserve include burning and mowing to reduce woody cover and promote the vitality of grassland. The location and aerial extent of each Culver's root occurrence is marked on infrared aerial photos that are updated annually by TGPP staff.

Outside the TGPP, Culver's root is known only from road allowances and roadside ditches. These populations are under threat from road maintenance.

Recommendations

Future Research

Culver's root is sold commercially as an ornamental species in Manitoba. There is a need to investigate whether cultivation of this species has an impact on natural populations. Cultivated specimens sold in nurseries likely originated from seed collected in the wild, which could reduce native populations (NatureServe 2001).

Surveys of appropriate habitat on private land adjacent to roadside populations are required. Continued monitoring is required on the TGPP to ensure that management strategies currently in use are not adversely affecting populations of Culver's root.

Management

The production of a Species at Risk fact sheet would promote awareness of Culver's root. Providing information to landowners within this species' range could result in the discovery of additional populations, or prevent the unintentional destruction of existing populations.

With the co-operation of the Overstoneville Independent Cemetery management committee, shrubs could be allowed to grow along the fence of the cemetery. If any dormant rootstocks or seeds were left, then allowing the area to be reclaimed by natural vegetation might allow the Culver's root to recover.

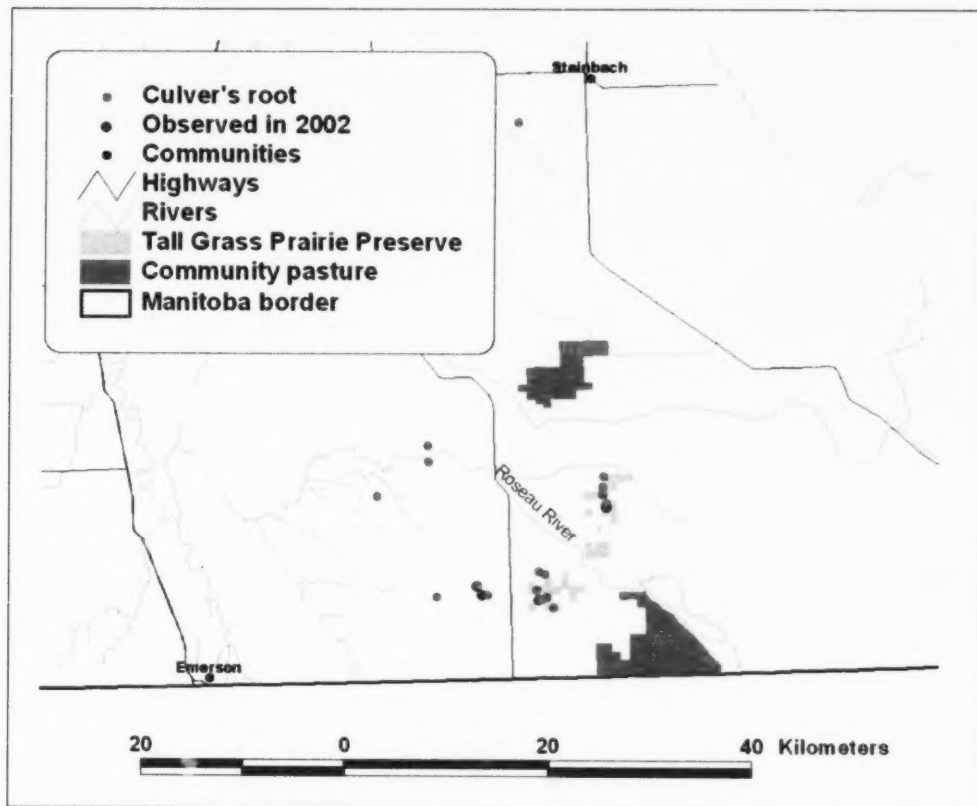


Figure 14. The distribution of Culver's root (*Veroncastrum virginicum*) in Manitoba.

Stewardship Recommendations

Stewardship requirements vary among species; however, several issues are common to all. The actions of land managers affect the survival of many rare plant occurrences and their habitat. As such, stewardship plans must be produced with input from landowners and managers, especially on private lands. Stewardship programs that inform landowners of the presence of rare species on their lands, present options for conservation, and aid landowners in implementing their chosen option will have the greatest benefit to rare species occurrences.

The following actions will promote stewardship of most rare species in Manitoba:

- Increase landowner awareness of rare species in agro-Manitoba. Species at risk fact sheets, pamphlets, and other print media, where they do not currently exist, should be produced. Local newspapers, radio, and television should be utilised as much as is practical to raise awareness. In all cases, the importance of sound stewardship by landowners should be stressed.
- Establish a stewardship resource centre. A variety of organisations offer support to landowners in the form of conservation agreements, stewardship programs like rotational grazing, prescribed burns, control of invasive species, etc. The assortment of stewardship options and conservation organisations that offer landowner support has lead to duplication of effort and confusion for landowners. The establishment of one contact point for landowners, acting as a clearinghouse of stewardship information, would simplify the first steps toward expanded stewardship of species at risk for landowners, help focus and reduce duplication of services among conservation organisations, and ultimately increase the number of landowners participating in stewardship activities.
- Produce a standard, effective landowner contact methodology in co-operation with other agencies. This protocol would streamline and standardise initial and subsequent contacts, improve reporting, and reduce duplication of effort.
- Establish a road allowance management plan. A number of species at risk occurrences occur in remnant native habitat in road and railway allowances and are threatened by maintenance activities such as haying, spraying of herbicides, drainage alteration, and trenching or digging activities conducted by municipalities or utility companies. In most cases, municipal maintenance staff is not aware of the presence of these occurrences. A contact protocol and management plan, produced in co-operation with Manitoba Transportation and rural municipalities, is required in order to ensure the continued existence of many populations of rare and at-risk species.

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Appendix: Definitions of Conservation Status Ranks

Adapted from the Manitoba CDC website, 1998

Species are evaluated and ranked by the Conservation Data Centre on the basis of their range-wide (global - G) status, nation-wide (national - N) status, and province-wide (subnational - S) status according to a standardised procedure used by all Conservation Data Centres and Natural Heritage Programs. These ranks are used to determine protection and data collection priorities and are revised as new information becomes available.

For each level of distribution—global, national, and provincial—species are assigned a numeric rank ranging from 1 (very rare) to 5 (demonstrably secure). This reflects the species' relative endangerment and is based primarily on the number of occurrences of that species globally, nationally, or within the province. However, other information, such as date of collection, degree of habitat threat, geographic distribution patterns and population size and trends, is considered when assigning a rank. The numbers of occurrences listed below are suggestions, not absolute criteria. For example, the Green Frog (*Rana clamitans*) is ranked G5, S2. That is, globally the species is abundant and secure, while in Manitoba it is rare and may be vulnerable to extirpation.

Rank	
1	Very rare throughout its range or in the province (5 or fewer occurrences, or very few remaining individuals). May be especially vulnerable to extirpation.
2	Rare throughout its range or in the province (6 to 20 occurrences). May be vulnerable to extirpation.
3	Uncommon throughout its range or in the province (21 to 100 occurrences).
4	Widespread, abundant, and apparently secure throughout its range or in the province, with many occurrences, but the element is of long-term concern (> 100 occurrences).
5	Demonstrably widespread, abundant, and secure throughout its range or in the province, and essentially irradicable under present conditions.
U	Possibly in peril, but status uncertain; more information needed.
H	Historically known; may be rediscovered.
X	Believed to be extinct; historical records only, continue search.

Other Heritage Codes

Code	
G#G#	Numeric range rank: A range between two of the numeric ranks. Denotes range of uncertainty about the exact rarity of the species.
N#N#	
S#S#	

Subrank

Code	
T	Rank for subspecific taxon (subspecies, variety, or population); appended to the global rank for the full species, e.g. G4T3.

Qualifiers

Code	
A	Accidental in the province; including species (usually birds or butterflies) recorded very infrequently, hundreds or thousands of kilometres outside their usual range.
B	Breeding status of a migratory species. Example: S1B,SZN - breeding occurrences for the species are ranked S1 (critically imperilled) in the province, nonbreeding occurrences are not ranked in the province.
E	An exotic established in the province; may be native in nearby regions.
HYB	Element represents a hybrid of species.
N	Non-breeding status of a migratory species. Example: S1B,SZN - breeding occurrences for the species are ranked S1 (critically imperilled) in the province, nonbreeding occurrences are not ranked in the province.
P	Indicates the element may potentially occur in the province.
Q	Taxonomic questions or problems involved, more information needed; appended to the global rank.
R	Reported in the province, but lacking documentation that would provide a basis for either accepting or rejecting the report.
T	Rank for subspecific taxon (subspecies, variety, or population); appended to the global rank for the full species.
Z	Ranking not applicable.
#	A modifier to SX or SH; the species has been reintroduced but the population is not yet established.
?	Inexact or uncertain; for numeric ranks, denotes imprecision.

